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Second Letter Report of Test Results of USATECOM Project No. 8-3-0300-07 F, Product Improvement Test of Armaltite AR-15 Rifle

Army Infantry Board Fort Benning Ga

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UNITED STATES ARMY INFANTRY BOARD
Fort Benning, Georgia 31905 Capt Gosney/mae/545-1092

STEBC-SA

SUBJECT: Second Letter Report of Test Results of USATECOM Project No 8-3-0300-07 F, Product Improvement Test of Armaltite AR-15 Rifle

TO: Commanding General
United States Army Test and Evaluation Command
ATTN: AMSTE-BC
Aberdeen Proving Ground, Maryland 21005

1. REFERENCES.

a. Report of Project No 3008, USAIB, 7 December 1962, Comparative Evaluation of AR-15 (Armalite) and M14 Rifles (U).

b. Letter, AMSTE-BC, USATECOM, 19 July 1963, subject: "Test of Bolt Assist Device, AR-15 Rifle."

c. Letter, STEBC-SA, USAIB, 30 August 1963, subject: "Modified AR-15 Rifle."

d. Letter, STEBC-SA, USAIB, 30 August 1963, subject: "Test Results of USATECOM Project No 8-3-0300-07 F, Product Improvement Test of Armalite AR-15 Rifle."

2. AUTHORITY.

a. Directive.

(1) Telephone call between Colonel R. C. Williams, USAIB, and Colonel T. A. Rafferty, USATECOM, 27 September 1963.

(2) Letter, AMSTE-BC 0300-07F, USATECOM, 30 September 1963, subject: "Bolt Closing Device on AR-15 Rifle."

b. Purpose. To determine the suitability of the side mounted bolt assist device on the AR-15 rifle.

3. DESCRIPTION OF MATERIEL. The modified AR-15 rifles received for this test differ from those tested in November 1962 in that a bolt assist device has been added. The configuration of this bolt assist device, hereinafter referred to as the side mounted bolt assist device, has been changed from

that found on the rifles tested in August 1963 (ref 1d). The side mounted bolt assist device consists of a housing mounted on the side of the receiver that encases and holds by means of a retaining pin the spring-loaded plunger assembly. This assembly consists of pawl, return spring, and plunger cap. Six of the weapons received had the housing mounted on the right and five had the housing mounted on the left side of the receiver, presumably to facilitate evaluation to determine best location of the bolt assist device. The side of the bolt carrier has been modified by cutting vertical notches to insure positive engagement by the forward tip of the plunger assembly. When the rear of the plunger cap is pushed the tip of the pawl engages one of the notches and forces the bolt carrier forward approximately 3/8 to 1/2 of 1 inch. If this is not sufficient to close the bolt, the plunger assembly must be allowed to return to its original position by spring action and then be pushed again as many times as necessary to close the bolt (incl 1 and 2).

4. BACKGROUND.

a. In November 1962 the US Army Infantry Board tested the AR-15 rifles and found eleven deficiencies and two shortcomings (ref 1a).

b. In August 1963 the US Army Infantry Board tested AR-15 rifles which contained a charging handle bolt assist device. These modified AR-15 rifles further differed from the ones tested in November 1962 in that a new type magazine fabricated of aluminum was provided. Presumably, these modifications were designed to correct three of the previously reported eleven deficiencies (excessive failures to feed, excessive failures to chamber the first round, and insufficient charging handle leverage). As a result of the test conducted, the US Army Infantry Board found that the charging handle bolt assist device was unsuitable for army use and the new magazines did not show worthwhile improvement in reliability over the rifles previously tested (ref 1d).

c. The AR-15 rifles with the side mounted bolt assist device were received on 2 October 1963.

5. TEST RESULTS.

a. Testing of the most recently modified AR-15 rifles was conducted on 2 October 1963. Four AR-15 rifles with the side mounted bolt assist device were used in each of the following exercises: (Three of the rifles used had the housing mounted on the right side of the receiver and one of the housings mounted on the left side.)

(1) Exercise I - The four modified AR-15 rifles were fired at the rate of 40 rounds per minute for 5 minutes, allowed to cool, and were then cleaned.

(2) Exercise I - The four modified AR-15 rifles were exposed to settling dust as might be encountered in a convoy on a dusty road, after which they were wiped off as would be practical in a hurried field situation, fired at the rate of 40 rounds per minute for 5 minutes, allowed to cool, and then cleaned.

(3) Exercise III - The four modified AR-15 rifles used in this exercise had a liberal coat of oil on the bolt and bolt carrier. The rifles were then submerged in water, withdrawn, and wiped as dry as would be practical in a hurried field situation, after which they were fired at a rate of 40 rounds per minute for 5 minutes.

b. The following malfunctions occurred during the exercises described in paragraph 3 above (total 2,465 rounds):

	Rifle No 012719 Exercises			Rifle No 012819 Exercises			Rifle No 011619 Exercises			Rifle No 011185 Exercises			
	I	II	III	I	II	III	I	II	III	I	II	III	TOT
Failure to feed	1	-	-	-	-	-	-	-	-	-	1	2	4(1)
Failure to extract	-	-	1	-	-	-	-	-	-	-	-	3	4
Failure of bolt to remain open after last round was fired from the magazine	-	2	-	-	1	-	-	-	1	-	-	-	4
Failure to chamber the first round upon release of the bolt catch	1	1	-	-	2	1	-	2	1	1	1	4	14(14)
Stoppages that could not be cleared by immediate action	-	-	-	-	-	-	-	-	-	2	-	-	2

(1 stuck cartridge, bolt could not be opened)
(1 rim pulled off cartridge by force of gas operations during cycling. Cartridge case was left in the chamber)

c. All of the 15 failures to feed or chamber, where a round was picked up and moved forward by the bolt for any distance (shown parenthetically in above table), could be cleared by the side mounted bolt assist device.

d. Rapid reloading exercises were conducted using rifles with the chambers deliberately filled with grit so that the bolt did not always move to the locked position. The right side mounted bolt assist device housing was more convenient for the right-handed firer. The right-handed firer used his left hand to press the bolt catch to release the bolt carrier. If he attempted to fire and could not or he suspected for any other reason that the bolt did not lock, he rotated the weapon so that he could see the ejection port. This placed the right side mounted plunger in a more accessible position to be struck by the right hand. Also, as a matter of training (because of the excessive failures to chamber encountered with the AR-15 rifles), the firer may be taught to press the bolt catch, then strike the plunger of the bolt assist device with his hand. In this case, the right side housing is best for the right-handed firer.

e. During the course of the firing and reloading exercises it was noted that the plunger cap was too small as it caused pain when struck with the heel of the hand (a human factors shortcoming).

f. The side mounted bolt assist device was inspected from the standpoint of sling arms carrying qualities. Short marches were conducted to determine if any incompatibility with the individual clothing and equipment existed because of the addition of the housing. No undesirable conditions have been introduced by this bolt assist device.

g. The capability of applying leverage to open the bolt has not been improved with this device. The Springfield Armory bolt assist device tested in August 1963 (ref 1d) provided some increased leverage by the addition of a knob on the rear of the charging handle. However, that added leverage was determined to be insufficient. The side mounted bolt assist device had no provision for any increase in leverage over the unacceptable manual bolt opening capability provided on the AR-15 rifles tested in November 1962. This still remains a deficiency.

h. The other deficiencies which still remain to be corrected are: front sight difficult to adjust; excessive trigger pull; bipod influence upon bullet impact; improper ejection pattern; poor pointing qualities; excessive failures to feed; cartridge case inadequately crimped to hold bullet; and absence of tracer. Of the remaining deficiencies previously reported and not discussed elsewhere, it appeared that two were relegated to shortcomings. These were excessive failures to chamber the first round, which were alleviated by the manual closure assist the side mounted bolt assist device provided, and excessive failures of the bolt to remain open after the last round is fired

STEEC-SA 14 OCT 1963

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because of the less serious nature and less frequent occurrence of this malfunction. Of the two previously reported shortcomings, lack of durability for bayonet fighting remained, but no instance of involuntary trigger pin displacement was noted.

6. CONCLUSIONS. The United States Army Infantry Board concludes that:

a. The bolt assist device used in this test provides an adequate but not an optimum means of closing the bolt of the AR-15 rifle in event of a stoppage.

b. The mounting of the bolt assist device on the left side of the receiver of the AR-15 rifle is not acceptable.

c. The bolt assist device does not provide the leverage necessary to open the bolt in the event of certain stoppages.

d. Eight other deficiencies previously reported and two shortcomings in the AR-15 rifle and .223 caliber ammunition have not been corrected.

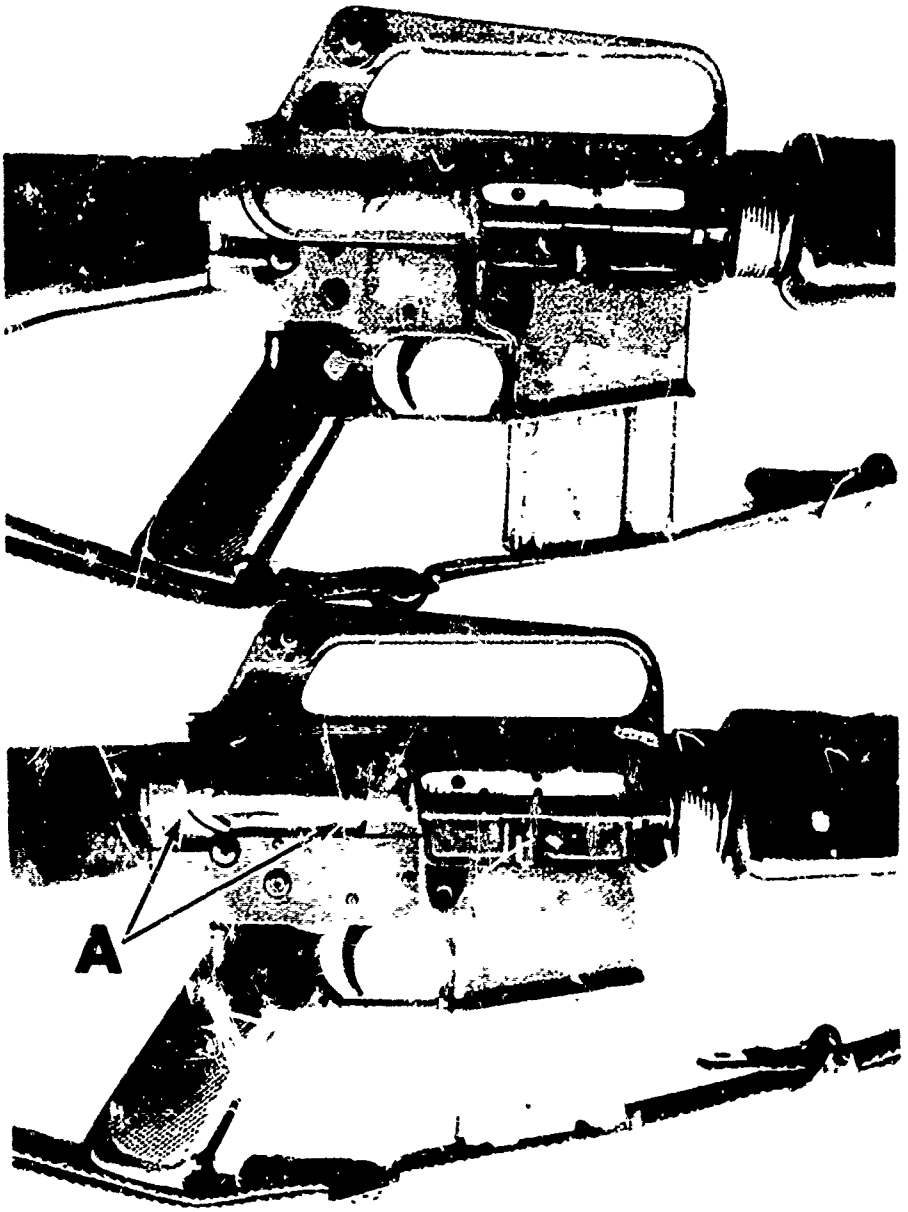
7. RECOMMENDATIONS. It is recommended that:

a. The bolt assist device, mounted on the right side of the receiver as tested, be considered acceptable for bolt closure when the striking surface of the plunger cap is increased in size to provide better striking area.

b. Leverage necessary for manually opening the bolt be provided, correction of the remaining deficiencies previously reported, and correction of as many as possible of the shortcomings previously reported be provided prior to consideration of adoption of the AR-15 rifle.

R. C. WILLIAMS
Colonel, Infantry
President

2 Incl
Photos



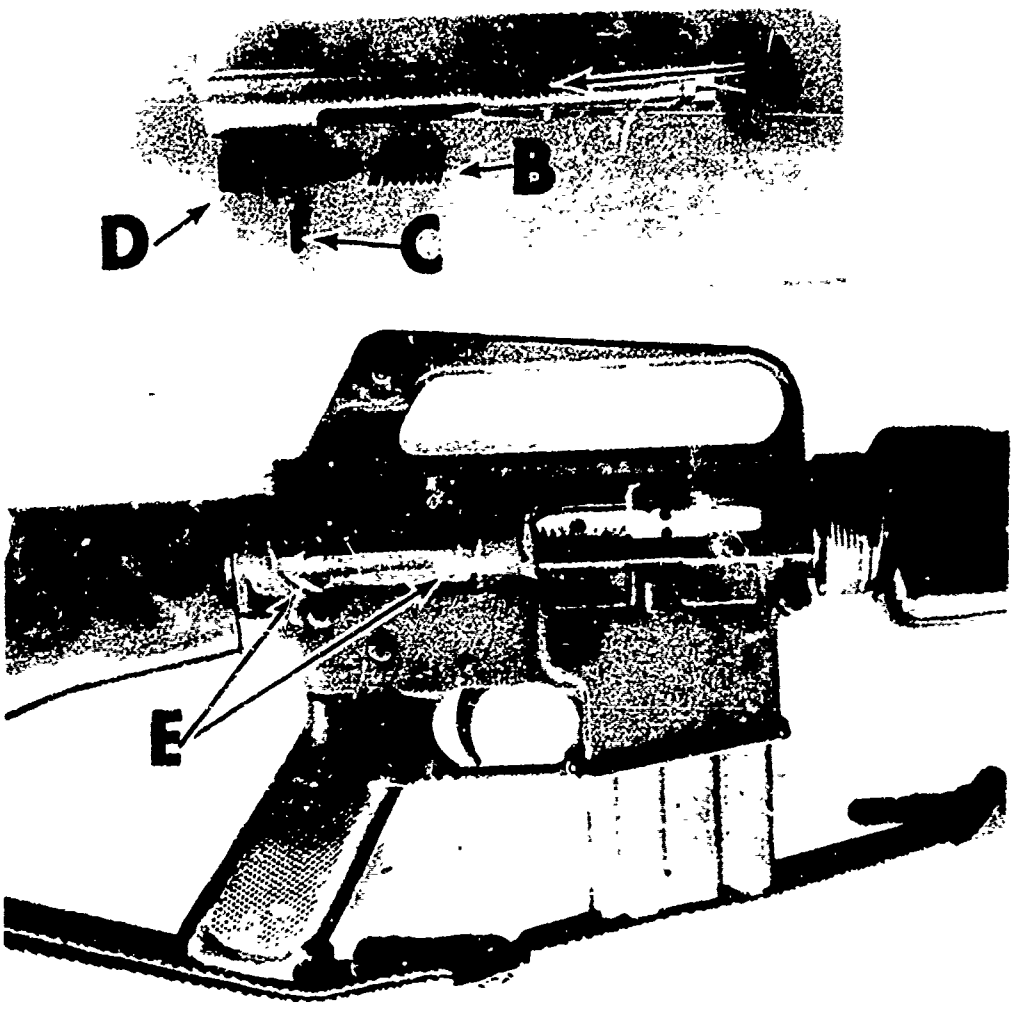
UNITED STATES ARMY INFANTRY BOARD

FORT BENNING, GEORGIA

SECOND REPORT OF TEST RESULTS OF USATECOM PROJECT NO 8-3-0300-07 F,
PRODUCT IMPROVEMENT TEST OF ARMALITE AR-15 RIFLE

TOP: Receiver of AR-15 rifle as tested in November 1962. (No bolt assist device)

BOTTOM: Receiver of AR-15 rifle with bolt assist device (A) mounted on right side. NOTE: The AR-15 rifles with left side mounted bolt assist device have the device mounted directly opposite to the one shown.



UNITED STATES ARMY INFANTRY BOARD

FORT BENNING, GEORGIA

SECOND REPORT OF TEST RESULTS OF USATECOM PROJECT NO 8-3-0300-07 F,
PRODUCT IMPROVEMENT TEST OF ARMALITE AR-15 RIFLE

Right side mounted bolt assist device:

A. Bolt carrier with vertical notches.
B. Return spring.
C. Retainer pin.
D. Plunger cap and pawl.
E, Housing on rifle which encases return spring, retainer pin, and plunger cap and pawl.

HEADQUARTERS
U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005

AMSTE-BC 0030-07F

20 SEP 1963

SUBJECT: Bolt Closing Device on AR-15 Rifle

TO: President
US Army Infantry Board
ATTN: STEBC-SA
Fort Benning, Georgia 31905

1. During the latter part of August, a modified AR-15 rifle was tested by your Board. This modification consisted of a larger charging handle with double latch and a bolt closing device.

2. Since this modification did not completely fulfil its intended purpose, the rifle has undergone another modification consisting of a serrated bolt with a ratchet type closing device. According to information received in this headquarters, eleven rifles were shipped 28 Sep 63.

3. It is directed that your agency conduct similar tests on this modification as previously reported 30 Aug 63. In addition, evaluate human engineering factors such as portability through dense foliage, effects of device on gunner while firing and other factors where applicable.

4. A letter report of test in eight copies is desired by 4 Oct 63; however, a verbal report is acceptable prior to the letter report.

5. Consider this task as a second letter report under USATECOM Project No. 8-3-0030-07F.

FOR THE COMMANDER:

JOHN W. RODGERS
Colonel, GS
C, Admin Ofc

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